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ABSTRACT

Medical College Admission Test (MCAT) score differences were examined for Black and White examinees who entered American medical schools in 1978 and 1979. The incidence of academic difficulty resulting in delayed graduation, withdrawal, or dismissal was also examined. The MCAT provides six scores: biology, chemistry, physics, science problems, skills analysis (reading), and skills analysis (quantitative). Mean MCAT scores for White students ranged from 8.0 to 8.5; for Blacks 4.8 to 5.6. Of this sample of medical students, 4.7 percent of the Whites and 28.5 percent of the Blacks experienced academic difficulty. Both Black and White students with MCAT scores below 8 had an increasing probability of academic difficulty. The data for Blacks, it was cautioned, were based on small sample sizes at individual score points. It was suggested that other students preadmission variables, such as experience, motivation, and adjustment, may be related to success or failure in medical school. (GDC)

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RACIAL/ETHNIC DIFFERENCES IN THE PREDICTIVE VALIDITY OF MCAT SCORES

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The Medical College Admission Test (MCAT) is a standardized, multiple cognitive abilities battery designed to predict success in medical school. It tests understanding of undergraduate introductory level concepts in biology, chemistry, and physics. It also tests analytical skill in the context of narrative and quantitative material.

Like other standardized tests, performance differences are evident on the MCAT for population subgroups differentiated by sex and racial/ethnic status (AAMC, 1986). Jones and Vanyur (1985) discuss sex differences on the MCAT and present data on score validity for male and female medical students.

The current research looks at MCAT score differences for black and white examinees and matriculants. MCAT scores are also related to the incidence of academic difficulty in medical school for the two groups. The analyses are based on all students entering accredited U.S. medical schools in 1978 and 1979.

The MCAT is composed of six tests or areas of assessment: Biology, Chemistry, Physics, Science Problems, Skills Analysis: Reading, and Skills Analysis: Quantitative. The score scale for each area ranges from one to

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fifteen; the standard deviation for each is 2.5. Mean MCAT scores in the six areas for whites tested in 1977 and 1978 ranged from 8.0 to 8.5. Mean area scores for black examinees in the same period ranged from 4.8 to 5.6. Mean subgroup differences ranged from 2.7 to 3.6 score points for the six areas. Mean test scores for 1978 and 1979 white matriculants ranged from 9.4 to 9.8. For blacks, mean test scores ranged from 6.3 to 7.1. The mean area differences between black and white enrollees ranged from 2.4 to 3.3 points. These data appear in Tables 1 and 2.

Discussions of selection bias appear frequently in the testing literature. Linn (1984) defines bias as a systematic tendency to over - or underestimate the qualifications of members of a particular group. The MCAT subgroup differences discussed above can be examined for bias in relation to performance variance in medical school. These MCAT/school performance relationships can be used to address the validity of MCAT test results for black and white examinees.

Students entering medical school in 1978 and 1979 who encountered academic problems resulting in either delayed graduation or withdrawal/dismissal were identified. Table 3 presents MCAT data for these students by population group. Of the 1978-1979 matriculants, 4.7% of the white enrollees experienced academic difficulty; 28.5% of the black students had academic difficulty.

The percentages of black and white matriculants experiencing academic difficulty are plotted by MCAT score level in Figures 1 and 2. When these percentages are compared across groups, a puzzling picture emerges. The plots of average science scores and average reading/quantitative scores show no differences in the percentages of white students experiencing academic

difficulty with MCAT scores of 8 or above; the percentages increase monotonically below 8, however. In other words, white enrollees with average scores of 8 or above experience little academic difficulty. Those below 8 have a linearly increasing probability of experiencing academic difficulty.

For black enrollees, the plots are less consistent because of smaller sample sizes at individual score points. These plots also show an increased probability of academic difficulty as MCAT scores decrease. The incidence of academic difficulty increases monotonically below 8 for black matriculants as it does for whites. In some cases the differences are as large as 24%. However, the probability of experiencing academic difficulty for blacks is higher at all score levels than it is for whites. This means that a black student has a greater probability of experiencing academic problems than a white student even when MCAT performance is at the same level.

These results are consonant with a great number of studies on differential prediction for minority and majority groups. They are inconsistent with popular opinion and do not support the usual goals that motivate equal opportunity and affirmative action programs. Linn (1984) states that the common overprediction observed for minority examinees may not be indicative of bias but may result from measurement imprecision. Specifically, he points up the effect of misspecification of the predictor domain on the detection of selection bias. The remainder of this discussion is devoted to the possibility of specification of a more complete predictor space for minority and majority student performance in medical school.

The MCAT is one of many pieces of preadmission data submitted by medical school applicants. Students also submit data on course enrollment/performance, work experience, extracurricular activities, research

involvement, etc. It is conceivable that preadmission characteristics for subgroup members at the same MCAT levels may differ systematically and these differences may relate to performance variance in medical school. For example, differences in undergraduate programs of study, health-related extracurricular involvement, employment, or research experience may exist for black and white matriculants at the same test score levels. Such experiential differences may, indeed, predict performance variance in medical school.

Similarly, differences in non-experiential characteristics, such as motivation to succeed, willingness to meet rigorous academic demands, and social and psychological adjustment, may underlay performance differences in medical school. Many feel, for example, that entry to medical school requires substantially more social adjustment for black students than for white matriculants. It is hypothesized that the social requirements of medical school, added to the rigorous academic routine, result in a disproportionate number of minority students experiencing academic difficulty. This thesis can be partially addressed by examining the incidence of academic difficulty for black students accepted into white medical schools from predominantly black undergraduate institutions. The level of academic difficulty for these students should be higher than that addressed for blacks coming from mixed undergraduate colleges or entering predominantly black medical schools.

Data are needed on these variables and on similar expansions of the predictor domain with respect to performance in medical school for black and white matriculants. Performance data will soon be available for the 1980 entering medical school classes. These students will shortly be added to the data base and included in the above analyses. The equivalence of various preadmission variables will also be examined for blacks and whites at similar MCAT score levels. Research is also planned to examine medical school

performance separately for blacks entering predominantly white and predominantly black medical schools to see if retention/academic difficulty/attrition patterns differ for the two groups. The racial composition of the undergraduate institution will also be considered for these students. These analyses may shed light on the source(s) of medical school performance differences for black and white enrollees.

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TABLE 1

MEAN MCAT SCORES FOR 1977-1978 EXAMINEES

	White Examinees		Black Examinees	
	1977	1978	1977	1978
Biology	8.2	8.3	5.3	5.4
Chemistry	8.1	8.0	5.1	5.3
Physics	8.2	8.3	5.5	5.6
Science Problems	8.2	8.3	5.1	5.5
Reading	8.4	8.5	5.2	5.1
Quantitative	8.4	8.3	4.8	4.9
Group Size	46,340	41,693	3,868	3,787

TABLE 2

MEAN MCAT SCORES FOR 1978-1979 MATRICULANTS

	White Matriculants		Black Matriculants	
	1978	1979	1978	1979
Biology	9.6	9.7	6.8	7.1
Chemistry	9.8	9.7	6.7	6.8
Physics	9.7	9.8	6.7	6.8
Science Problems	9.8	9.8	6.6	6.9
Reading	9.4	9.5	6.9	7.0
Quantitative	9.7	9.6	6.4	6.3
Group Size	13,153	12,840	869	966

TABLE 3

PERCENTAGE OF 1978 AND 1979 ENTERING STUDENTS BY RACIAL/ETHNIC GROUP AT EACH MCAT SCORE LEVEL EXPERIENCING ACADEMIC DIFFICULTY[1]

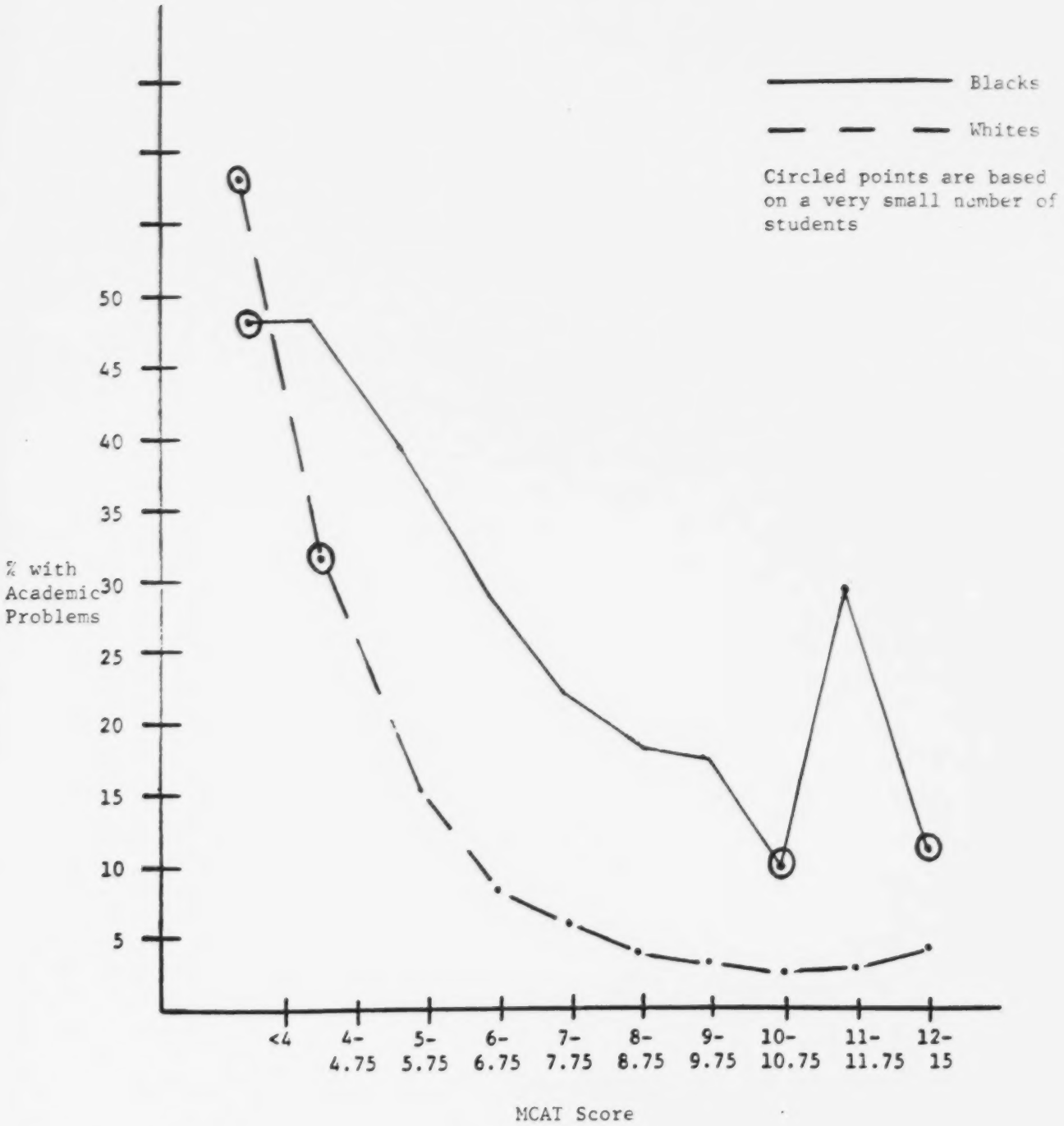
Science Average MCAT	Black		White		Reading/ Quantitative Average MCAT	Black		White	
	N	%	N	%		N	%	N	%
12-15	12	12.5	133	5.6	12-15			64	5.8
11	5	33.3	154	3.9	11	8	27.6	165	3.9
10	5	10.6	212	3.5	10	12	17.4	349	4.9
9	24	18.3	290	4.3	9	31	21.2	312	4.4
8	46	18.9	229	4.8	8	40	15.6	196	4.3
7	91	22.1	157	7.4	7	110	29.5	107	5.6
6	134	28.8	67	9.3	6	104	26.3	54	8.4
5	129	39.1	20	15.7	5	99	33.6	15	10.7
4	70	48.6	6	31.6	4	66	38.6	5	14.3
3	14	48.3	2	66.7	3	37	54.4	2	50.0
2					2	10	66.7	1	50.0
1					1	2	66.7		
TOTAL	519	28.5[3]	1270	4.7		519	28.5	1270	4.7

1 Academic problems include delayed graduation and withdrawal/dismissal for academic reasons.

2 Results for N's less than 20 should be interpreted with caution.

3 Percentage of matriculating subgroup experiencing academic difficulty.

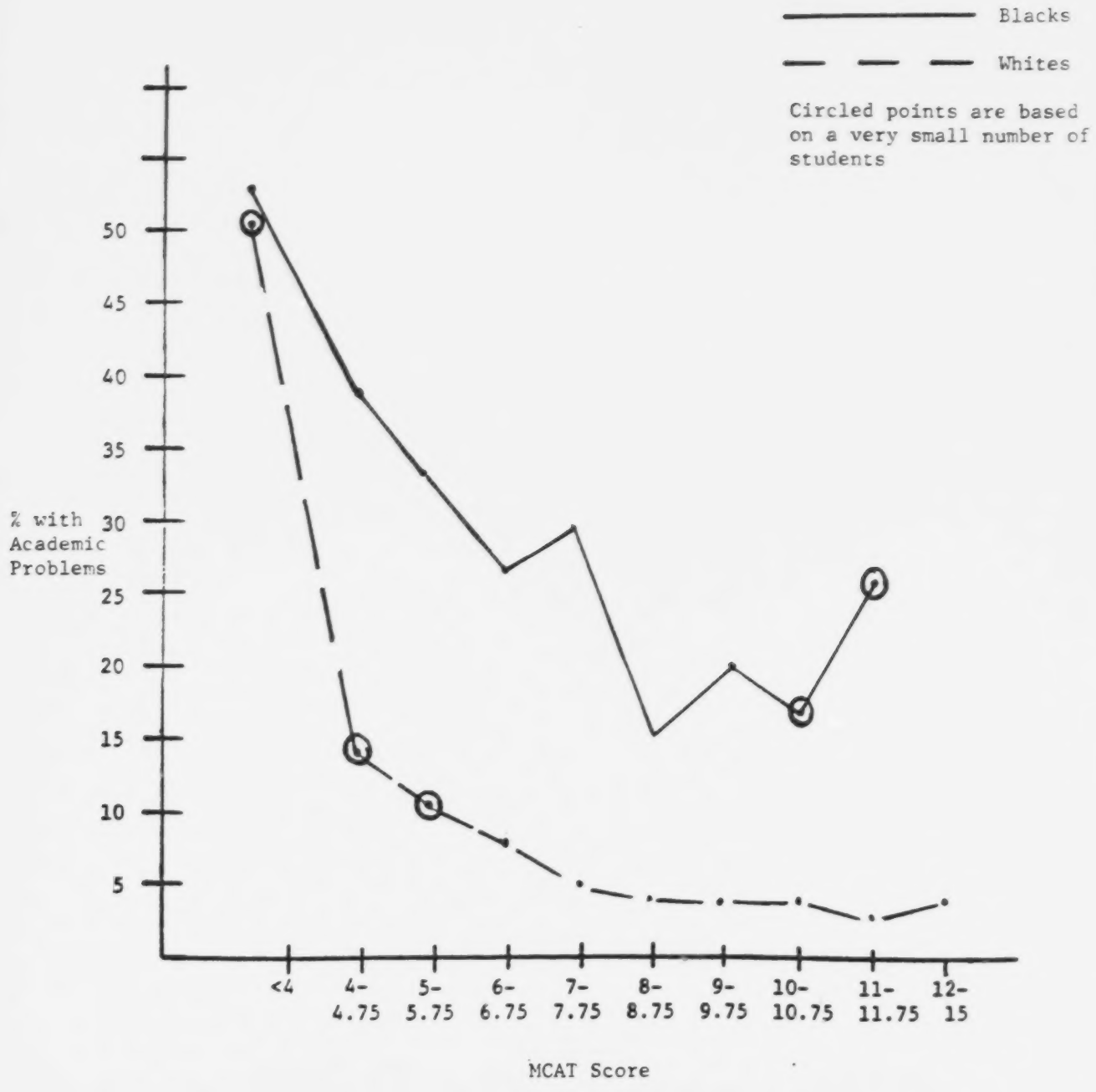
FIGURE 1



Average in Biology, Chemistry, Physics and Science Problems

Percentage of students having academic problems in medical school by Medical College Admission Test (MCAT) scores - 1968 and 1979 entering classes.

FIGURE 2



Average of Skills Analysis:Reading and Quantitative

Percentage of students having academic problems in medical school by Medical College Admission Test (MCAT) scores - 1978 and 1979 entering classes